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EXAMINER

STAICOVICI, STEFAN

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/754,486
Filing Date: January 03, 2001
Appellant(s): TEMPLE ET AL.

MAILED

SEP 08 2005

GROUP 1700

Bryan J. Lempia
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 13, 2005 appealing from the Office action
mailed January 12, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct. However, in view of the After-Final amendment filed June 13, 2005 claims 36-37 have been allowed.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. However, it is noted that the After-Final amendment filed with the Appeal Brief on June 13, 2005 has been entered and considered.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,263,250	NISHIWAKI et al.	11-1993
5,569,238	SHEI et al.	10-1996

4,316,074	DALY	02-1982
5,048,938	HIZNY	09-1991
UK 2 262 253 A	TURNER	06-1993

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

B. Claims 9 and 34-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 9, the limitation that the beam is “inverted” and directed “along an axis collinear with said first axis” by reflecting the beam off a “planar reflecting surface” and a “at least two additional beam reflecting surfaces” is not clear to one ordinarily skilled in the art. According to Figure 5a and the original specification at page 12, line 12 through page 13, line 25, it appears that inversion of the laser beam can occur only when reflecting the laser beam off three reflecting surfaces. Further, it should be noted that inversion of the beam could not occur when using *four* (emphasis added) reflecting surfaces. Further clarification is required. Claims 34-35 are rejected as dependent claims.

C. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

D. Claims 9, 23-24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No. 5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238) and in further view of GB 2 262 253 A.

Nishiwaki *et al.* ('250) teach the basic claimed apparatus and process for forming nozzles in a nozzle plate for an inkjet print head including, splitting a laser beam (3) into a plurality of secondary beams using a system of prisms and a flyeye lens (4), hence introducing a divergence into the secondary beams, whereas the origin of divergence being apart from the point where beam splitting occurs (see Figure 2), followed by a process of recombining and directing the secondary beams, using a convergent lens, toward a single aperture of a mask as defined by a light transmissible portion as shown in Figure 5, whereas the resulting light spot is made to coincide to with the light transmissible portion (aperture) of the mask (see col. 4, lines 54-56).

Regarding claims 9, 23-24 and 31, Nishiwaki *et al.* ('250) does not teach directing the laser beam to a first reflecting surface and then to at least two additional beam reflecting surfaces that are rotating as an assembly such as to invert the beam in a collinear direction. Shei *et al.* ('238) teach an optical homogenizer system including a first, second and third reflecting means (discrete members) that rotate (130) (see col.4, lines 53-57). It should be noted that because the optical homogenizer system reshapes and homogenizes the beam in a circular fashion that said

homogenizer rotates. Further, it should be noted that because the optical homogenizer system of Shei *et al.* ('238) includes a similar structure as claimed, specifically three rotating reflecting surfaces placed at an angle to the incoming beam, then it is submitted that the outgoing laser beam of Shei *et al.* ('238) is inverted. Therefore, it would have been obvious for one of ordinary skill in the art to have provided an optical homogenizer system including a first, second and third reflecting means that rotate as taught by Shei *et al.* ('238) in the process of Nishiwaki *et al.* ('250) because, Shei *et al.* ('238) specifically teach that such a homogenizer reshapes and homogenizes the beam in a circular fashion, hence improving the quality of the resulting nozzles. It should be noted that the apparatus of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) teach a nozzle plate substrate and a beam homogenizer.

Further regarding claims 9, 23-24 and 31, Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) do not teach forming a reverse tapered hole (directing said beam at said substrate such that said beam first impinges upon the face of the nozzle plate in which said nozzle outlet is formed...nozzle inlet is larger in diameter than nozzle outlet). GB 2 262 253 A teaches a laser drilling process including rotating a laser beam about the polar axis of a fixed spherical lense by rotating an optical assembly that reflects the laser beam between an outer mirror (11) and an inner mirror (14) such that a reversed tapered hole is formed (see Abstract). Further, it is noted that the optical assembly in the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238), hence the laser beam, is also rotated. Therefore, it would have been obvious for one of ordinary skill in the art, in view of the teachings of GB 2 262 253 A, that upon rotation of the laser beam assembly as taught by GB 2 262 253 A in the process of Nishiwaki *et al.* ('250) in view of Shei

et al. ('238) to have obtained a reverse tapered hole, because GB 2 262 253 A specifically teaches that rotation of the laser beam forms a reverse tapered hole, whereas Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) teach rotating of the optical assembly and hence, rotating the laser beam.

E. Claims 9, 23-24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view GB 2 262 253 A.

Nishiwaki *et al.* ('250) teach the basic claimed apparatus and process for forming nozzles in a nozzle plate for an inkjet print head including, splitting a laser beam (3) into a plurality of secondary beams using a system of prisms and a flyeye lens (4), hence introducing a divergence into the secondary beams, whereas the origin of divergence being apart from the point where beam splitting occurs (see Figure 2), followed by a process of recombining and directing the secondary beams, using a convergent lens, toward a single aperture of a mask as defined by a light transmissible portion as shown in Figure 5, whereas the resulting light spot is made to coincide to with the light transmissible portion (aperture) of the mask (see col. 4, lines 54-56).

Regarding claims 9, 23-24 and 31, Nishiwaki *et al.* ('250) does not teach directing the laser beam to a first reflecting surface and then to at least two additional beam reflecting surfaces that are rotating as an assembly such as to invert the beam in a collinear direction. GB 2 262 253 A teaches a laser drilling process including rotating a laser beam about the polar axis of a fixed spherical lense by rotating an optical assembly including, an inner mirror (14) having two reflecting surfaces and an outer mirror (11) having two reflecting surfaces (see Figure 4), that rotate and reflect the laser beam such that a reversed tapered hole is formed (see Abstract).

Further, it should be noted that because the optical assembly of GB 2 262 253 A includes a similar structure as claimed, specifically a first reflecting surface and at least two additional reflecting surfaces placed at an angle to the incoming beam, then it is submitted that the outgoing laser beam of GB 2 262 253 A is also inverted. Therefore, it would have been obvious for one of ordinary skill in the art to have provided a rotating optical assembly having a first reflecting surface and at least two additional beam reflecting surfaces that are rotating as an assembly as taught by GB 2 262 253 A in the process of Nishiwaki *et al.* ('250) because, GB 2 262 253 A teaches that such an assembly provides for reverse tapered holes, hence improving process versatility by allowing drilling of preformed surfaces in which the undersurface is not accessible. It should be noted that the system of Nishiwaki *et al.* ('250) in view of GB 2 262 253 A teach a nozzle plate substrate and a beam rotational-inverter.

F. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No. 5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238) and in further view of GB 2 262 253 A and Daly (US Patent No. 4,316,074).

Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A teach the basic claimed process as described above.

Regarding claim 25, although Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A teach reflective means, Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A do not specifically teach dielectric mirrors. Daly ('074) teaches the use of high reflectance dielectric mirrors (see col. 6, lines 30-35). Therefore, it would have been obvious for one of ordinary skill in the art to have used the high reflectance

dielectric mirrors of Daly ('074) in the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A because, Daly ('074) teaches that such mirrors have a 99% reflectance rate, whereas the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A requires reflective means for homogenizing the beam, hence improving process quality.

G. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of GB 2 262 253 A and in further view of Daly (US Patent No. 4,316,074).

Nishiwaki *et al.* ('250) in view of GB 2 262 253 A teach the basic claimed process as described above.

Regarding claim 25, although Nishiwaki *et al.* ('250) in view of GB 2 262 253 A teach reflective surfaces , Shei *et al.* ('238) do not specifically teach dielectric mirrors. Daly ('074) teaches the use of high reflectance dielectric mirrors (see col. 6, lines 30-35). Therefore, it would have been obvious for one of ordinary skill in the art to have used the high reflectance dielectric mirrors of Daly ('074) in the process of Nishiwaki *et al.* ('250) in view of GB 2 262 253 A because, Daly ('074) teaches that such mirrors have a 99% reflectance rate, whereas the process of Nishiwaki *et al.* ('250) in view of GB 2 262 253 A requires reflective means for reflecting and inverting the beam, hence improving process quality.

H. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238) and in further view of GB 2 262 253 A and Hizny (US Patent No. 5,048,938).

Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A teach the basic claimed process as described above.

Regarding claim 35, although Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A does not teach the use of a second mask interposed between the first mask (8) and the beam converging lens (10), the use of multiple masks to process a laser beam is well known in the art as evidenced by Hizny ('938) which teaches that "cleaning" of the beam occurs by using a spatial filter (mask) (see col. 1, lines 10-15). Therefore, it would have been obvious for one of ordinary skill in the art to have interposed a second mask (spatial filter) as taught by Hizny ('938) in the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) and further view of GB 2 262 253 A because, Hizny ('938) specifically teaches that using a spatial filter (mask) allows "cleaning" of the laser beam prior to its impingement on the target, hence improving product quality and also because Hizny ('938) specifically teaches that the use of spatial filters is well known.

I. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of GB 2 262 253 A and in further view of Hizny (US Patent No. 5,048,938).

Nishiwaki *et al.* ('250) in view of GB 2 262 253 A teach the basic claimed process as described above.

Regarding claim 35, although Nishiwaki *et al.* ('250) in view of GB 2 262 253 A does not teach the use of a second mask interposed between the first mask (8) and the beam converging lens (10), the use of multiple masks to process a laser beam is well known in the art

as evidenced by Hizny ('938) which teaches that "cleaning" of the beam occurs by using a spatial filter (mask) (see col. 1, lines 10-15). Therefore, it would have been obvious for one of ordinary skill in the art to have interposed a second mask (spatial filter) as taught by Hizny ('938) in the process of Nishiwaki *et al.* ('250) in view of GB 2 262 253 A because, Hizny ('938) specifically teaches that using a spatial filter (mask) allows "cleaning" of the laser beam prior to its impingement on the target, hence improving product quality and also because Hizny ('938) specifically teaches that the use of spatial filters is well known.

(10) Response to Argument

(a) In view of the After-Final amendment filed 6/13/2005 with the Appeal Brief:

(i) Claim 34 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

(ii) Claims 35-36 are allowed.

(b) Appellants argue that "[T]hose having ordinary skill in the art will readily and easily recognize that other reflecting arrangements could be utilized to achieve the recited beam characteristics" and as such "it is not the appellants' duty to disclose every possible structure, component arrangement, or device capable of achieving the recited beam characteristics" (see page 7 of the Appeal Brief filed 6/13/2005). In response, it is noted that under MPEP §2163(I), the "specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention." In the instant case, according to Figure 5a and the original specification at page 12, line 12 through

page 13, line 25, it appears that inversion of the laser beam can occur *only* (emphasis added) when reflecting the laser beam off three reflecting surfaces. Further, it should be noted that inversion of the beam could not occur when using *four* (emphasis added) reflecting surfaces. Further, it appears that Appellants agree that beam inversion cannot occur using four surfaces (see page 8, lines 1-8 of the Appeal Brief filed 6/13/2005). Furthermore, it is noted that under MPEP §2144.04(VI)(B), the “mere duplication of parts has not patentable significance unless a new and unexpected result is produced.” Hence, Appellants’ argument that “a competitor may conceive of some type of device using a dummy fourth reflecting surface...it would not fall within the scope of the claim” (see page 8 of the Appeal Brief filed 6/13/2005) is not persuasive.

(c) In response to Appellants’ argument that the teachings of Shei *et al.* (‘238) and GB 2 262 253 A are nonanalogous art (see pages 9-10 and 13-14 of the Appeal Brief filed 6/13/2005), it has been held that a prior art reference must either be in the field of applicant’s endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Shei *et al.* (‘238) teach an optical homogenizer system including a first, second and third reflecting means (discrete members) that rotate (130) (see col.4, lines 53-57) and homogenizes the beam, thereby obtaining a uniform beam having a uniform energy distribution. GB 2 262 253 A teaches a laser drilling process including rotating a laser beam about the polar axis of a fixed spherical lense by rotating an optical assembly that reflects the laser beam between an outer mirror (11) and an inner mirror (14) such that a reversed tapered hole is formed (see Abstract). It

is noted that Applicants state that the primary reference of Nishiwaki *et al.* ('250) teach forming an inkjet nozzle by achieving "uniformity of illumination" (see pages 13-14 of the Appeal Brief filed 6/13/2005). Hence, Shei *et al.* ('238) teach a process and apparatus that results in a laser beam having a uniform energy distribution, whereas GB 2 262 253 A teaches improving the versatility of the process by allowing drilling of preformed surfaces in which the undersurface is not accessible. Therefore, the teachings of Shei *et al.* ('238) and GB 2 262 253 A are deemed to be reasonably pertinent to the particular problem with which the applicant was concerned. Furthermore, it is submitted that it is desirable to achieve a more uniform laser beam energy distribution when laser machining in order to have control over the machining process and be able to repeat said machining process.

(d) In response to Appellants' argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., once the beamlets are reconverged, the beam does not rotate at all) are not recited in the rejected claim(s) (see page 13 of the Appeal Brief filed 6/13/2005). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

(e) Appellants argue that "any combination of Nishiwaki, Shei, and Turner (GB 2 262 253 A) would destroy the specific and intended teachings of Nishiwaki to quickly and accurately produce *multiple nozzles* in a nozzle plate *at the same time*" (emphasis added) (see pages 11-12 and 15-16 of the Appeal Brief filed 6/13/2005). In response, it is noted that under MPEP §2144.04(VI)(B), the "mere duplication of parts has not patentable significance unless a

new and unexpected result is produced.” Hence, whether a single or multiple holes are produced has not patentable significance. Furthermore, it is noted that under MPEP §2144(VII), “[T]he fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility.” In re Farrenkopf, 713 F.2d 714, 219 USPQ 1 (Fed. Cir. 1983). Hence, whether holes are being produced slowly or fast has not patentable significance. Furthermore, it is noted that the optical homogenizer of Shei *et al.* (‘238) or the rotating optical assembly of GB 2262253A are positioned downstream of the flyeye lens in the process of Nishiwaki *et al.* (‘250) and as such, a plurality of holes are still formed by the process of Nishiwaki *et al.* (‘250) in view of Shei *et al.* (‘238) and in further view of GB 2 262 253 A or Nishiwaki *et al.* (‘250) in view of GB 2 262 253 A, hence “the specific and intended teachings of Nishiwaki to quickly and accurately produce *multiple nozzles* in a nozzle plate *at the same time*” are not destroyed as argued by Appellants.

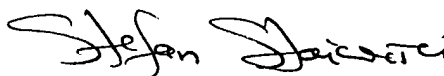
(f) Appellants argue that the beam in GB 2262253A “is not rotating about its own axis, but instead is moving in a circle parallel to and spaced from the axis 17 of rotation of assembly 8” because “laser beam 18 does not enter or exit the assembly 8 co-linear with the axis 17 of rotation “(see page 12 of the Appeal Brief filed 6/13/2005). In response, it is noted that in Figure 4 of GB 2262253A it is shown a laser beam (18) traveling co-linear with the axis of rotation 17. Further, it is noted that GB 2262253A teaches that assembly 11 is rotated about axis 17 (see Figure 4).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Stefan Staicovici, PhD

9/2/05

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